

REMARKS

This paper is filed in response to the final office action mailed on November 17, 2004.

Claims 1, 7, 9 and 19 have been amended; claims 6, 8, 10 and 20 have been canceled; claims 1-5, 7, 9 and 11-19 remain pending.

Turning to the rejections based upon the prior art, the Patent Office rejects claims 1-3, 11, 12 and 15 under 35 U.S.C. §102(e) as allegedly be anticipated by U.S. Patent No. 5,412,246 ("Dobuzinsky"). In response, claim 1 has been amended to traverse this rejection. Specifically, claim 1 has been amended to make it clear that the gate pattern is a stacked structure of a polysilicon film, an anti-diffusion film stacked on the polysilicon film and a metal film stacked on the anti-diffusion film. These three films are stacked on the gate oxide film. The hard mask is formed on top of the gate pattern. Claim 1 then requires a cleaning process to be carried out using a hydrofluoric acid solution on the polysilicon film before the anti-diffusion film is stacked on the polysilicon film to remove any native oxide that is disposed on the polysilicon film and then is formed during the deposition of the polysilicon film. Dobuzinsky does not teach or suggest these claimed elements and therefore cannot anticipate claim 1.

Under MPEP § 2131,

[t]o anticipate a claim, the reference must teach every element of the claim. A claim is anticipated only if each and every element as set forth in the claim is found, either expressly or inherently described, in a single prior art reference.

Citing, Verdegaa Bros. v. Union Oil Co. of California, 814 F.2d 628, 631, 2 USPQ2d 1051, 1053 (Fed. Cir. 1987). Thus, Dobuzinsky cannot serve as an anticipating reference to claim 1 and therefore the anticipation rejection of claims 1-3, 11-12 and 15 under 35 U.S.C. §102(e) is improper and should be withdrawn.

More specifically, Dobuzinsky teaches a stacked structure of only a polysilicon film 34 and a dielectric mass 36. Dobuzinsky does not teach or suggest the anti-diffusion film or the metal film stacked on the polysilicon film. Thus, Dobuzinsky does not teach or suggest the oxidation of the sidewalls of the stacked structure of amended independent claim 1. For this reason alone, Dobuzinsky fails to serve as an anticipating reference.

However, more important, Dobuzinsky does not teach or suggest the treating of its polysilicon film 34 with any solution designed to remove any native oxide layer formed on the polysilicon film 34 during the formation thereof. Dobuzinsky is silent in this regard. In contrast, claim 1 requires treatment with a HF solution and antecedent support for the amendments to claims 1 and 19 can be found on page 4, lines 20-23. Support for the other amendments regarding the stacked structure of claim 1 are found in Figs. 1A-1C as filed and their related description in the specification on pages 4 and 5.

Therefore, because Dobuzinsky does not teach or suggest the cleaning technique or the stacked structure of amended claim 1, Dobuzinsky cannot teach or suggest the oxidation of the sidewalls of the stacked structure of amended claim 1 and therefore Dobuzinsky fails entirely to serve as an anticipating reference for amended claim 1. Accordingly, dependent claims 2-3, 11-12 and 15 are not anticipated by Dobuzinsky as well.

Next, the Patent Office rejects the remaining claims under 35 U.S.C. 103 as being unpatentable over Dobuzinsky in view of U.S. Patent No. 6,746,925 ("Lin") (claim 4), or Dobuzinsky in view of U.S. Patent No. 6,720,630 ("Mandelman") (claims 5-10), or Dobuzinsky in view of U.S. Patent No. 6,297,172 ("Kashiwagi") (claims 13-14), or Dobuzinsky in view of U.S. Patent No. 6,320,238 ("Kizilyalli") (claim 16), or Dobuzinsky in view of Kizilyalli in further in view of U.S. Patent No. 6,274,429 ("Misra") (claims 17-18) or, finally, Dobuzinsky in view of Mandelman, Kizilyalli and Misra (claim 19).

In response, independent claims 1 and 19 have been amended to require the formation of the oxide films on sides of the gate pattern stack, that includes a polysilicon film, an anti-diffusion film and a metal film, and not on the hard mask, which is formed on top of the gate pattern. Independent claims 1 and 19 have also been amended to make it clear that the polysilicon film is treated with a HF solution to remove any native oxide prior to deposition of the anti-diffusion and metal films. These amendments effectively remove Dobuzinsky as a base reference and the remaining references cannot be used to establish a *prima facie* case of obviousness.

Under MPEP §§ 2142 and 2143,

[t]o establish a *prima facie* case of obviousness, three basic criteria must be met. First, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings. Second, there must be a reasonable expectation of success.

Finally, the prior art reference (or references when combined) must teach or suggest all the claim limitations. The teaching or suggestion to make the claimed combination and the reasonable expectation of success must both be found in the prior art, and not based on applicant's disclosure.

Citing, In re Vaeck, 947 F.2d 488, 20 USPQ2d 1438 (Fed. Cir. 1991); *see also* MPEP § 2143-§ 2143.03 for decisions pertinent to each of these criteria.

For the reasons stated above, Dobuzinsky is deficient as a base reference because it does not teach or suggest the treatment of a polysilicon film with a HF solution prior to the deposition of an anti-diffusion film and metal film thereon. Further, Dobuzinsky does not teach or suggest a gate pattern stack that includes a polysilicon film, an anti-diffusion film and a metal film or the formation of an oxide layer on sidewalls of such a stacked gate pattern. Because Dobuzinsky is clearly deficient as a base reference and because no combination of Dobuzinsky with the secondary references teach or suggest every claim limitation as required by MPEP §§ 2142 and 2143, none of the other combinations of Dobuzinsky with the secondary references establishes a *prima facie* case of obviousness of independent claims 1 or 19.

Specifically, the first secondary reference, Lin, is merely cited for the proposition that it teaches dielectric metal oxide films. Lin is not cited for, nor does Lin teach or suggest, a stacked structure that includes a polysilicon film, an anti-diffusion film and a metal layer or the formation of an oxide film on sidewalls of such a stacked structure without the formation of an oxide on the hard mask. Lin also does not teach or suggest any treatment of a polysilicon film with HF to remove native oxide material.

Mandelman, on the other hand, teaches a stacked structure for MOSFET devices. However, Mandelman does not teach or suggest the oxidizing of sidewalls of such a structure. Instead, Mandelman teaches the deposition of a dielectric layer 24 on the entire stacked structure. This material is typically flooring and carbon-containing material. See column 5, line 48. Mandelman does not teach or suggest the treatment of the polysilicon gate electrode 16 with HF. Accordingly, Mandelman cannot supplement Dobuzinsky in this regard.

Kashiwagi merely teaches plasma oxidization using oxygen and hydrogen. However, Kashiwagi does not teach or suggest the formation of an oxide film on sidewalls of the stacked structure as recited in independent claims 1 and 19. Kashiwagi does not teach or

suggest treatment of a polysilicon film with HF. Therefore, Kashiwagi cannot supplement Dobuzinsky in connection with the deficiencies of Dobuzinsky which are discussed above.

Kizilyalli is merely cited for the proposition that it teaches the use of ultraviolet rays to activate ozone. Thus, Kizilyalli cannot supplement the structural deficiencies of Dobuzinsky or Dobuzinsky's failure to teach or suggest the treatment of a polysilicon film with HF as discussed above.

Misra is cited for the proposition that it teaches annealing. However, Misra does not teach or suggest the stacked structure of amended claims 1 and 19 or the treatment of a polysilicon film with HF as recited in amended claims 1 and 19. Thus, Misra cannot supplement Dobuzinsky in terms of the deficiencies of Dobuzinsky as discussed above.

Therefore, no combination of the cited references, Dobuzinsky, Mandelman, Kizilyalli, Misra, Lin and Kashiwagi teaches or suggests the stacked structure recited in amended claims 1 and 19, the formation of an oxide layer on sidewalls of the stacked structure of amended claims 1 and 19 or the treatment of a polysilicon film with HF prior to the deposition of an anti-diffusion film and metal film thereon. Accordingly, applicants respectfully submit that no *prima facie* case of obviousness has been established and an early action indicating the allowability of claims 1-4, 7, 9 and 11-19 is earnestly solicited.

The Commissioner is authorized to charge any fee deficiency required by this paper, or credit any overpayment, to Deposit Account No. 13-2855.

Dated: January 18, 2005

Respectfully submitted,

By 

Michael R. Hull

Registration No. 35,902

MARSHALL, GERSTEIN & BORUN LLP

233 S. Wacker Drive, Suite 6300

Sears Tower

Chicago, Illinois 60606-6357

(312) 474-6300

Attorney for Applicant